17. ~~Figs. 1 - 7 are schematic views of systems according to the present invention~~.

Fig. 1 is a schematic view of a system according to the present invention.

Fig. 2 is a schematic view of a system according to the present invention.

Fig. 3 is a schematic view of a system according to the present invention.

Fig. 4 is a schematic view of a system according to the present invention.

Fig. 5 is a schematic view of a system according to the present invention.

Fig. 6 is a schematic view of a system according to the present invention.

Fig. 7 is a schematic view of a system according to the present invention.

25. Optionally, the steam in the line 34 may be used in a boiler 90 that produces steam. This steam may be used to power another apparatus and/or it can be fed back to the tank 14.

26. Methanol needed for startup of the turbine 60 may be fed from

40. The electrical generator 161 produces useful electrical power. Exhaust from the steam turbine 160 containing water and steam flows in a line 162 to a steam condenser 163. The steam condenser 163 produces water which flows in a line 1641, and through a control valve/splitter 165. Water flows from the control valve/splitter 165 in a line 166 to the insulated holding tank 117. Excess water flows in a line 167 to collection apparatus 168. Pumps may be used on any line to facilitate flow where gravity is insufficient for the desired flow rate.

44. Fig. 4 shows a power plant system 200 according to the present invention. The system 200 of Fig. 4 is like systems in U.S. Patent 6,178,735 B1 (incorporated fully herein for all purposes); but the system 200 has a system 232 like the system 112 (Fig. 3) and feeds a similar feed (as produced by the system 112) to a combustion chamber 202. The system 200 has a gas turbo-generator set 210 GT and also has a following open air-turbine process LT. The gas turbo-generator set itself is of conventional design: it consists of a compressor unit 201, a combustion chamber 202 operated with fuel 203 from a system 232 (like the system 112, Fig. 3), a following turbine 204 and a generator 208. Connected on the exhaust gas side of the turbine 204 is a recuperator 205 which corresponds approximately to the waste heat steam generator of a combined cycle plant. The exhaust gases 214 from the turbine 204 flow through this recuperator 205 which is operatively connected to the air-turbine process LT already mentioned, primarily to an expander turbo-generator set which consists of an expander 206, compressor 207 and generator 209. The intake air 215 to the lastmentioned <u>compressor</u> ~~expander~~ 207, after compression, flows to the recuperator 205 and there undergoes caloric treatment by a heat exchange method, the flue gases 226 which occur as a result being discharged. The compressed air 216 from the compressor 207 flows through the recuperator 205, in which it undergoes caloric treatment before acting, as heated compressed air 217, on the expander 206. The expanded compressed air 218 then flows via a recooler 219 into a separator 10. The compressor 207 has injection cooling, so that the compressed air 216 subsequently treated per se in the recuperator 205 is moderately heated. Accordingly, the expansion of the compressed air, compressed quasi-isothermally in

place in the expander 206 with a respectable steam content, the latter being per se unsaturated. The differential power released at the generator 209 is only insignificantly lower than the difference between polytropic and quasi-isothermal compressor power in a conventional plant. Depending on the pressure ratio of the expander 206, a small part of the steam is already condensing out toward the end of expansion. However, at least the greater part condenses in the recooler 219 already mentioned. From the following separator 210, the recooled air 220 flowing out of the latter then leaves the process via a line 221 which is operatively connected to a regulating member 212. In order to condition, that is to say cool or preheat, the intake air 213 of the gas turbo-generator set GT, as required, part of the recooled air 220 is guided into the intake air 213. The water condensed out of the expanded air 218 is collected in the separator 210 and is fed into the compressor 207 again, via a feed pump 211, for the purpose of internal cooling 224 by evaporation. The water losses are compensated for by means of a feedwater delivery line 223. In this respect, a plurality of smaller gas turbines GT, even of different types, can cooperate with a large hot-air turbine LT. A plurality of small high-speed hot-air turbines LT can also be assigned to a high-power gas turbine GT. Their supersynchronous rotational speeds can be stabilized, for example, via a converter 225.

49. Fig. 5 shows a system 10a according to the present invention which is like the system 10, Fig. 1, and like numerals indicate like parts. The system 10a has lines 31 and 33 for flowing steam from the top of the reformer 40 back into the line 26 to add additional moisture to the reformer 40. A valve 46 selectively controls flow in the line 33. With a valve 41 in a line 21 closed and the valve 46 open, steam flows to the line 26. In one aspect, with the valve 46 ~~33~~ closed, steam from the top of the reformer is pumped by the pump 20 in the lines 31 and 21 to the vaporizer 30. A valve 45 selectively controls flow in the line 16.

55. The gas turbine system 360 (driven by the heat of combusted hydrogen which may have some water in the form of steam in it) drives the electrical generator 362. Steam exhausted from the turbine in the production of electricity flows to a condensation system 390. Optionally, hot condensed water from the system 390 flows in a line 365 to the reformer 340 providing heat thereto. Suitable pumping apparatus and flow lines are provided in the system 390 or associated therewith to pump the steam to the